

**Math 116 Section 04**

Quiz 1

Name \_\_\_\_\_

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Student Number \_\_\_\_\_

All solutions are to be presented on the paper in the space provided.  
The quiz is open book. You can discuss the problem with others and  
ask the TA questions.

Let  $f(x) = x^2$  and  $g(x) = \sin(x)$ . Calculate the following derivatives:

$$(1) \ f'(x) = 2x$$

$$(2) \ \frac{dg}{dx}(x) = \cos(x)$$

(3)

$$\begin{aligned} \left( \frac{d}{dx}(f \cdot g) \right)(x) &= f'(x) \cdot g(x) + f(x) \cdot g'(x) \\ &= 2x \sin(x) + x^2 \cos(x) \end{aligned}$$

(4)

$$\begin{aligned} \left( \frac{d}{dx} \left( \frac{g}{f} \right) \right)(x) &= \frac{g'(x)f(x) - g(x)f'(x)}{(f(x))^2} \\ &= \frac{\cos(x)x^2 - 2x \sin(x)}{x^4} \\ &= \frac{\cos(x)x - 2 \sin(x)}{x^3} \end{aligned}$$

$$(5) \ (f \circ g)'(x) = f'(g(x)) \cdot g'(x) = 2 \sin(x) \cos(x)$$

Calculate the derivatives of the following functions:

$$(1) \ y = \tan(x). \quad y' = \sec^2(x)$$

$$(2) \ g(x) = e^{x^2}. \quad g'(x) = 2xe^{x^2}$$

$$(3) \ f(x) = \ln(\sin(x)). \quad f'(x) = \frac{\cos(x)}{\sin(x)} = \cot(x)$$

$$(4) \ y = \cos^{-1}(x). \quad y' = -\frac{1}{\sqrt{1-x^2}}$$

$$(5) \ f(x) = \sec(x). \quad f'(x) = \sec(x) \tan(x)$$